Question Number	Solution	Marks	Notes
2	Driving force $= \dfrac{3P}{12}$	B1	Use of $P = Fv$ Allow for $\dfrac{P}{12}$ in second equation if not awarded here
	Motion up the hill $F - R - W\sin\theta = 0$	M1	Need all terms. Condone sign errors and sin/cos confusion.
	$\dfrac{3P}{12} - R - \dfrac{9000}{15} = 0$ $\left(\dfrac{3P}{12} - R = 600\right)$	A1	Correct substituted equation Any equivalent form
	Motion down the hill $F + W\sin\theta - R = \dfrac{9000}{9.8} \times \dfrac{9.8}{20}$	M1	Need all terms. Condone sign errors and sin/cos confusion.
	$\dfrac{P}{12} + \dfrac{9000}{15} - R = 450$ $\left(\dfrac{P}{12} - R = -150\right)$	A1 A1	Substituted equation with at most one error. Any equivalent form. Correct substituted equation. Any equivalent form.
	Solve for P or R	DM1	Dependent on both preceding M marks
	$\left(\dfrac{2P}{12} = 750\right) \Rightarrow P = 4500$	A1	One correct
	$R = 525$ (530)	A1	Both correct
		(9)	
SC1	Misread mass = 9000kg Gives equations $\dfrac{P}{4} = R + 5880$ $\dfrac{P}{12} = R - 1470$ Solutions: $P = 44100, R = 5145$		B1 M1A0 M1A1ftA0 M1A1ftA1ft Total 7/9
SC2	Use of mass = weight = 9000 Gives equations $\dfrac{P}{4} = R + 600$ $\dfrac{P}{12} = R + 3810$ Solutions: $P = -19260, R = -5415$		B1 M1A1 M1A1A0 M1A0A0 Total 6/9
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